

The identity of *Chlorodius miliaris* A. Milne Edwards, 1873, and the establishment of a new genus of Chlorodiinae (Crustacea, Decapoda, Brachyura, Xanthoidea, Xanthidae) from New Caledonia

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ABSTRACT

The identity of the poorly known xanthid crab *Chlorodius miliaris* A. Milne Edwards, 1873, from New Caledonia is clarified, and a new genus of Chlorodiinae is described for the species. *Sulcodius* n. gen. possesses well-defined carapace regions; distinctly granulated cheliped surfaces, an antero-external angle of the basal antennal segment that extends into the orbital hiatus, filling it entirely; and a cheliped merus with a strongly grooved dorsal surface. The new genus is allied to *Chlorodiella* Rathbun, 1897, *Pilodius* Dana, 1851 and *Phymodius* A. Milne Edwards, 1863 and the relationships between the four genera are discussed, and distinguishing characters tabulated.

KEY WORDS

Xanthidae,
Chlorodiinae,
taxonomy,
new genus,
Indo-West Pacific.

RÉSUMÉ

Identité de Chlorodius miliaris A. Milne Edwards, 1873 et établissement d'un nouveau genre de Chlorodiinae (Crustacea, Decapoda, Brachyura, Xanthoidea, Xanthidae) de Nouvelle-Calédonie.

L'identité de *Chlorodius miliaris* A. Milne Edwards, 1873, crabe mal connu de la famille des Xanthidae, trouvé en Nouvelle-Calédonie, est clarifiée et un nouveau genre de Chlorodiinae est décrit pour cette espèce. *Sulcodius* n. gen. présente une carapace aux régions bien délimitées, des chélicèdes granuleux, l'angle antéro-externe de l'article basal antennaire qui pénètre dans le hiatus orbitaire et le remplit entièrement, et le mérius des chélicèdes à une surface dorsale avec un profond sillon. Ce nouveau genre est proche de *Chlorodiella* Rathbun, 1897, *Pilodius* Dana, 1851 et *Phymodius* A. Milne Edwards, 1863. Les relations existant entre ces genres sont discutées. Un tableau récapitulant leurs caractères distinctifs est proposé.

MOTS CLÉS

Xanthidae,
Chlorodiinae,
taxonomie,
genre nouveau,
Pacifique indo-ouest

INTRODUCTION

The type series of *Chlorodius miliaris* A. Milne Edwards, 1873, is extant and deposited in the Muséum national d'Histoire naturelle, Paris. It comprises three dried damaged syntype females from New Caledonia which were only briefly described and schematically illustrated. In a report on the zoological collections of HMS *Alert*, Miers (1884: 531) recorded some specific variation when he identified *Chlorodius miliaris* from Seychelles and stated that the two adult males "merely differed from M.-Edwards's description based on specimens from New Caledonia". A redescription of *Chlorodius miliaris* was given by De Man (1887: 280-281) when he examined material collected from the Malaysian Archipelago, however, his identification was questioned by Balss (1938: 38), Forest & Guinot (1961: 96), Guinot (1964: 23) and Serène (1984: 257). The photographs of a female syntype from New Caledonia by Guinot (1964: pl. X), clarified the morphological features of the right cheliped (fig. 1) and the carapace (fig. 2). Serène (1984: pl. XLIIID) later reproduced the carapace figure of Guinot (1964: pl. X, fig. 2),

published a key separating the species attributed to *Chlorodiella* (Guinot 1964: 254-255, 257), but did not redescribe *C. miliaris*. To date a full description, including the structure of the sternal plastron and male pleopods of *Chlorodius miliaris*, is not available.

The taxonomy of *Chlorodius miliaris* is confused. Rathbun (1897) considered *Chlorodius* H. Milne Edwards, 1834 invalid and proposed a new replacement name *Chlorodiella*. The generic placement of *C. miliaris* was further complicated when Balss (1938: 38) revised *Zoosymodes* (now *Zozymodes*) Heller, 1861 and stated that to this genus belong the "*C. miliaris* A.M.E." form described by De Man. According to Balss (1938: 52), the types of *Chlorodius miliaris* were not seen because they were no longer extant in the Paris Museum, however he did examine the material of De Man which was considered to be identical to *Leptodius effereus* Rathbun, 1907. Balss was uncertain about the determination of the Malaysian Archipelago material as *C. miliaris* by De Man because he commented that this could only be confirmed by the re-examination of the A. Milne Edwards' types (1873) since his illustration (pl. 8, fig. 3) obviously referred to



FIG. 1. — *Sulcodius miliaris* (A. Milne Edwards, 1873); ♂ 14.5 mm, New Caledonia (MNHN MP-B 24818); dorsal view.

another species. But Balss (1938) appeared to contradict apparent misgivings in the figure legends to 'Tafel II, fig. 2 (unpaginated), "Fig. 2. *Zoosymodes miliaris* (A.M.E.) 2: 1. De Man's Exemplare von Nordwacher Island". This caption appeared to introduce a new combination for *Chlorodius miliaris* and suggested that the material of De Man was synonymous with the specimens from New Caledonia. Later, Forest & Guinot (1961: 96) stated that the three female types of *Chlorodius miliaris* were still present in the collections of the Muséum national d'Histoire naturelle; they had examined the ornamentation of the carapace and chelipeds, and considered this species of A. Milne Edwards to be valid but not to belong to *Chlorodiella*. They agreed with Balss (1938: 38) that this species should not be attributed to *Chlorodiella*, but disagreed with its placement in *Zoosymodes* (as *Zoosymodes*). While reviewing *Zoosymodes*,

Guinot (1964: 22-23) commented upon the work of Balss (1938: 38). She also considered *Chlorodius miliaris* A. Milne Edwards, 1873 as a valid species, provided photographs of a female syntype (1964: pl. X, figs 1; 2) and regarded its placement by Balss in *Zoosymodes* to be incorrect. Further, Guinot considered the description of *Chlorodius miliaris* by De Man (1888: 280) to be poor. Although she had not seen the material that Balss (1938: 38 'Taf. II, fig. 2) had attributed to *Leptodius effereus* Rathbun, 1907 (p. 39, pl. 1, fig. 11; pl. 7, fig. 6, 6a) and was not consequently in a position to place it in a genus, Guinot concluded that the assignment of this Rathbun species to *Zoosymodes* by Balss was not justified. In a recent revision of the Indo-Pacific Ocean and Red Sea Brachyura, Serène (1984: 257-258, pl. XLIII D) referred the *Chlorodius miliaris* of A. Milne Edwards to *Chlorodiella* but did not resolve the taxonomic position of this species



FIG. 2. — *Sulcodius miliaris* (A. Milne Edwards, 1873); chelipeds; **A**, ♂ 25.7 × 14.5 mm, New Caledonia (MNHN MP-B 24818); **B**, ♀ 22.6 × 13.4 mm, New Caledonia (MNHN MP-B 24819). Scale bar: 2 mm.

TABLE 1. — Generic differences between *Phymodius*, *Pilodius*, *Chlorodiella* and *Sulcodius* n. gen.

Characters	<i>Sulcodius</i>	<i>Pilodius</i>	<i>Phymodius</i>	<i>Chlorodiella</i>
Basal antennal anteroexternal angle	prolonged completely filling orbital hiatus (Fig. 6A)	Prolonged into orbital hiatus (Fig. 6B)	not prolonged into orbital hiatus. (Fig. 6C)	not prolonged into orbital hiatus (Fig. 6D)
Antenna flagellum	does not enter orbital hiatus (Fig. 6A)	does not enter orbital hiatus (Fig. 6B)	enters orbital hiatus (Fig. 6C)	enters orbital hiatus (Fig. 6D)
Merus of the cheliped	dorsal surface deeply concave, strongly grooved medially (Fig. 1)	dorsal surface gently concave, not deeply grooved	dorsal surface gently concave, not deeply grooved	dorsal surface gently concave, not deeply grooved
Ambulatory dactylus	subterminal spine distinctly larger than terminal spine (Fig. 7A)	subterminal spine smaller than terminal spine (Fig. 7B)	subterminal spine smaller than terminal spine (Fig. 7C)	subterminal spine subequal to equal size to terminal spine (Fig. 7D)
Anterior sternal plastron	broad, male abdomen reaching only one-third length of sternite 4 (Fig. 8A, B)	broad, male abdomen reaching mid-length of sternite 4 (Fig. 8C)	narrow, male abdomen reaching mid-length of sternite 4 (Fig. 8D)	broad, male abdomen reaching one-quarter length of sternite 4 (Fig. 8E)

identified by De Man from Nordwachter Island (1984: 181, 257).

Xanthid crab material collected by ORSTOM (France) from New Caledonia was identified as *Chlorodiella miliaris*. As the specific and generic status of this species was questioned by a number of authors, its rediscovery in New Caledonia may now help resolve a number of taxonomic problems. Examination of the present series of *C. miliaris* specimens shows that this species cannot be retained in *Chlorodiella* because it has a very different carapace and antennal structure. In the form of the carapace, *C. miliaris* resembles members of *Phymodius*, but in the form of the antennae, *C. miliaris* seems closer to *Pilodius*. These differences suggest that a new genus should be established for *C. miliaris* in the Chlorodiinae.

The description of the carapace regions followed that proposed by Dana (1853). Measurements provided are the carapace width.

Specimens are deposited in the collection of the Muséum national d'Histoire naturelle (MNHN), Paris, France; The Natural History Museum (NHM), London, England, and the Zoological

Reference Collection (ZRC), Department of Zoology, National University of Singapore.

SYSTEMATICS

Family XANTHIDAE

MacLeay, 1838, *sensu* Serène, 1984

Subfamily CHLORODIINAE Alcock, 1898

Sulcodius n. gen.

Chlorodius A. Milne Edwards, 1873: 212 (part).
Chlorodiella – Serène 1984: 254 (part).

TYPE SPECIES. — *Chlorodius miliaris* A. Milne Edwards, 1873, by present designation. Monotypic.

ETYMOLOGY. — The name *Sulcodius* is derived from an arbitrary combination of the Latin "*sulcurnus*", alluding to the distinctive furrow on the merus of the cheliped, and the suffix of the related genera *Pilodius* and *Phymodius*. Gender masculine.

DIAGNOSIS

Carapace approximately hexagonal, most regions well-defined. Basal antennal segment very large,

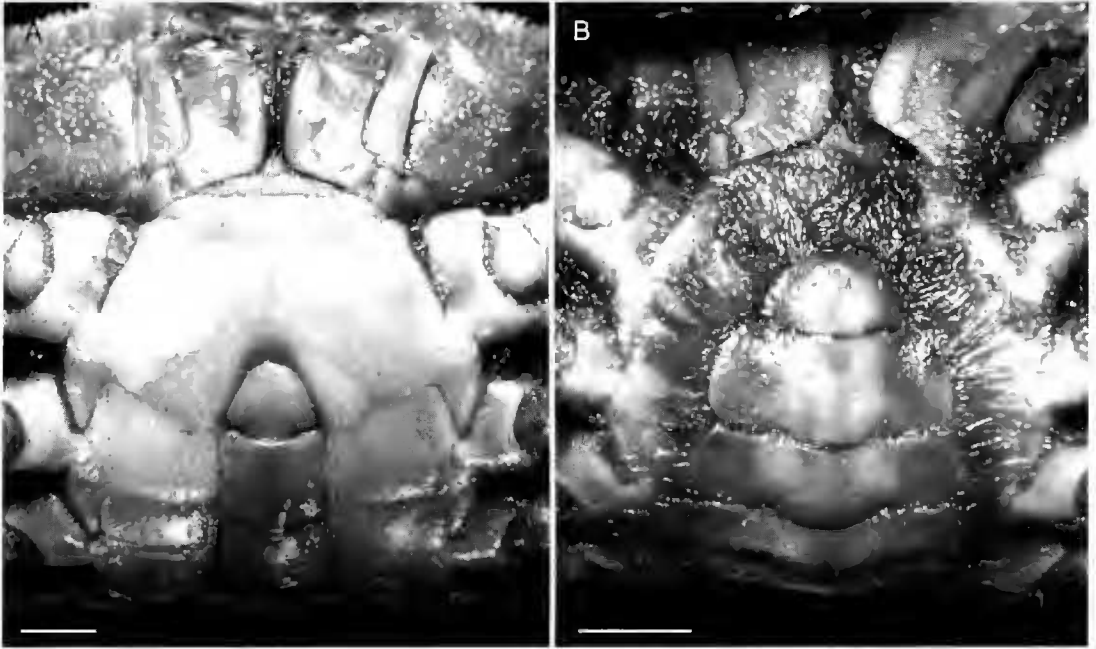


FIG. 3. — *Sulcodius miliaris* (A. Milne Edwards, 1873): anterior thoracic sternites and abdomen: A, ♂ 25.7 × 14.5 mm, New Caledonia (MNHN MP-B 24818); B, ♀ 15.5 × 9.4 mm, New Caledonia (MNHN MP-B 24817). Scale bars: 3 mm.

anteroexternal angle strongly produced, filling up entire space of orbital hiatus; flagellum excluded from orbit, lodged between cleft formed by outer lobe of frontal margin and internal supraorbital tooth. Chelipeds long; merus very elongate, extending beyond edge of carapace; dorsal surface of merus deeply grooved longitudinally, with anterior and posterior margins folding medially. Ambulatory dactylus with large subdistal ventral spine which is distinctly larger than terminal spine. Sternum relatively broad, sternites one and two fused, no suture discernible; suture between sternites two and three very deep; sternite three narrow, suture between sternites three and four shallow but discernible; sternite four with distinct but shallow median longitudinal suture; male abdomen reaching to about one-third length of sternite four; posterior part of episternite seven flap-like, overlapping outer anterior edge of male abdominal segment three when closed. Telson semicircular.

REMARKS

Sulcodius n. gen. belongs to the Chlorodiinae

because of its relatively broad carapace, non-projecting front, rounded and spoon-tipped fingers of the chelipeds, well-developed dactylopropodal lock on the ambulatory legs and the bifid termination of the ambulatory propodus (Serène 1984).

Forest & Guinot (1961) briefly discussed the taxonomic position of *Chlorodius miliaris*, noting that it was easily separable from all other *Chlorodiella* species by the distinct ornamentation of the carapace and chelipeds. They consequently agreed with Balys (1938) that *C. miliaris* should not be retained in *Chlorodiella*, but did not support the view that the species might be affiliated with the genus *Zosymodes* Heller, 1861. The genus *Zosymodes* is presently classified in the subfamily Zosiminae Alcock, 1898 (*vide* Serène 1984). *Chlorodius miliaris* is certainly not a zosimine as the tips of the fingers of its chelipeds are spooned, the tips of the ambulatory dactyli are bifurcated and the legs possess the dactylopropodal lock.

The external resemblance between *Sulcodius* n. gen. and *Chlorodiella* is superficial, with the

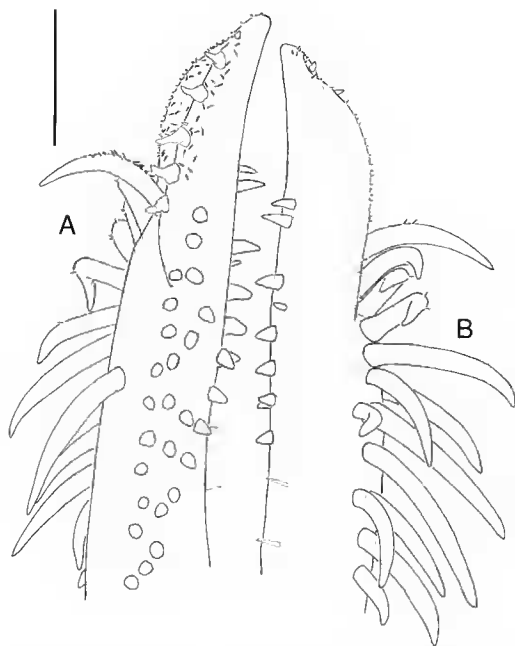


FIG. 4. — *Sulcodius miliaris* (A. Milne Edwards, 1873), left first pleopod; ♂ 25.7 × 14.5 mm, New Caledonia (MNHN MP-B 24818); A, ventral view; B, dorsal view. Scale bar: 0.2 mm.

carapace regions of *C. miliaris* being well-defined (Fig. 1) (poorly so in *Chlorodiella*), and the surfaces of the chelipeds distinctly granulated (Fig. 2) (smooth in *Chlorodiella*). The general form of their sternal plastron, abdomen and ambulatory dactylus however, is rather similar. In the form of the carapace, *Sulcodius* n. gen. resembles *Phymodius* but the anteroexternal angle of the basal antennal segment in *Sulcodius* n. gen. extends into the orbital hiatus, filling it entirely. The sternal plastron of *Sulcodius* n. gen. is also distinctly wider than that of *Phymodius*. In the structure of the basal antennal segment, *Sulcodius* n. gen. resembles *Pilodius*, but the anteroexternal angle in *Sulcodius* n. gen., is more strongly produced than in any known *Pilodius* species (Clark & Galil 1993; Ng & Yang 1998) and the form of their sternal plastron differs markedly (Table 1). The differences are consistent for a good series of *C. miliaris* examined from New Caledonia and the Indian Ocean, and are valid for both males and females as well as small

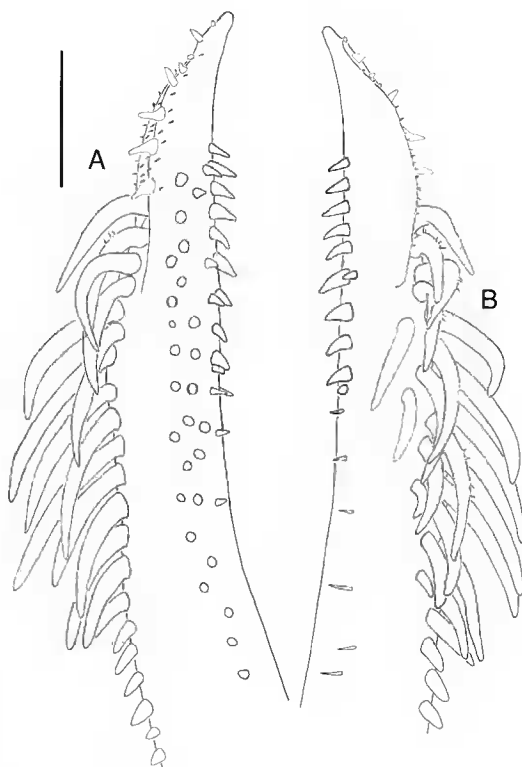


FIG. 5. — *Sulcodius miliaris* (A. Milne Edwards, 1873), left first pleopod; ♂ 21.2 × 13.7 mm, Seychelles (NHM 1882.24); A, ventral view; B, dorsal view. Scale bar: 0.2 mm.

specimens. These features vindicate the establishment of a separate genus for *Chlorodius miliaris*. The extensive prolongation of the basal antennal segment into the orbital hiatus (Fig. 6) in *Sulcodius* n. gen. requires further comment. In his subfamilial key, Serène (1984: 14, 17) stated that the basal segment of the antenna in Chlorodiinae is characterised by the absence of an "external antero-lateral lobule" which is feeble in *Pilodius*. But this angle (= lobule of Serène) is strongly developed in *Sulcodius* n. gen. and fills the entire orbital hiatus. Although this character does not comply completely with the key and definition of the Chlorodiinae by Serène (1984), there seems no justification for establishing a new subfamily to accommodate this new genus and perhaps *Pilodius*. However, Serène's (1984: 17) subfamilial key is confusing concerning the

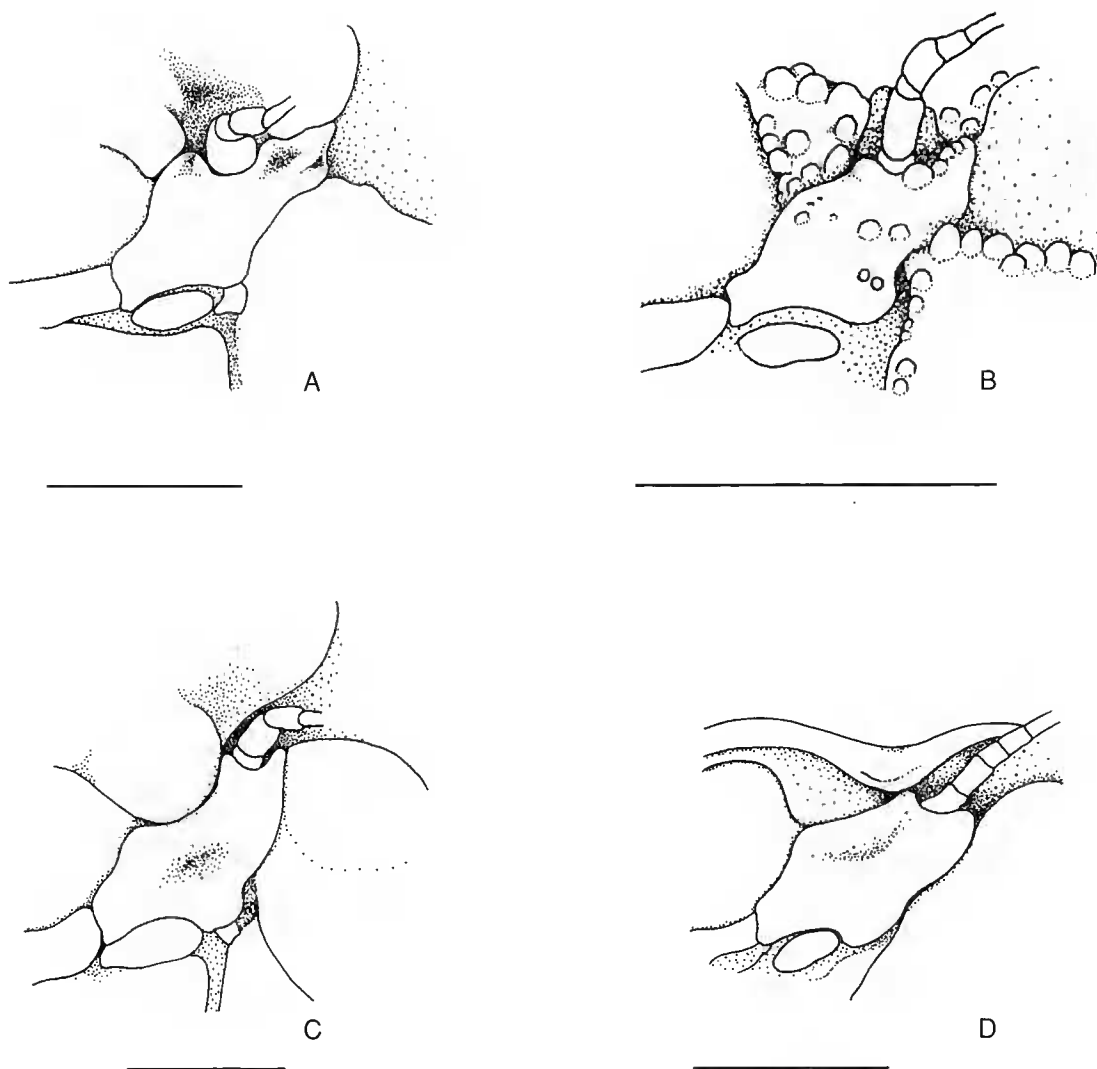


FIG. 6. — ♂ basal antennal segment and orbit; A, *Sulcodius milaris* (A. Milne Edwards, 1873) 22.6 × 13.4 mm, New Caledonia (MNHN MP-B 24819); B, *Pilodius granulatus* Stimpson, 1859 11.5 × 6.9 mm, Singapore (ZRC 1999-0073); C, *Phymodius unguatus* (A. Milne Edwards, 1873) 22.7 × 15.3 mm, Cocos-Keeling Islands (ZRC 1965.11.11.16); D, *Chlorodiella nigra* (Forskål, 1775) 17.3 × 11.0 mm, Singapore (ZRC 1999-0074). Scale bars: 1.0 mm.

exclusion of the antennal flagellum from the orbit. In couplet 11, Chlorodiinae, there is a suggestion that the normal situation for the genera other than *Pilodius*, is for the antennal flagellum to be excluded from the orbit. This opposes the first couplet to the key to the genera of the Chlorodiinae, where Serène (1984: 232-233)

uses the antennal flagellum to separate *Pilodius* Dana, 1851, from *Phymodius* A. Milne Edwards, 1863, *Tweedicia* Ward, 1934, *Chlorodiella* Rathbun, 1897, and *Liocarpilodes* Klunzinger, 1913. He notes that in *Pilodius* the basal segment of the antenna has the anterolateral external angle more or less prolonged and lodged in the

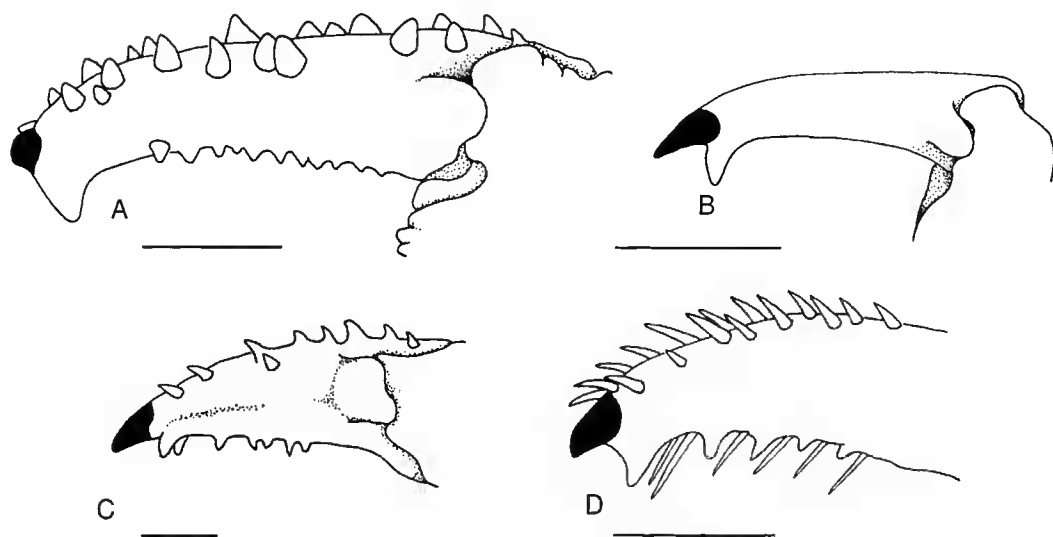


FIG. 7. — ♂ fourth left ambulatory dactylus; A, *Sulcodius miliaris* (A. Milne Edwards, 1873) ♂ 21.2 × 13.7 mm, Seychelles (NHM 1882.24); B, *Pilodius granulatus* Stimpson, 1859 11.5 × 6.9 mm, Singapore (ZRC 1999-0073); C, *Phymodius unguulatus* (A. Milne Edwards, 1873) 22.7 × 15.3 mm, Cocos-Keeling Islands (ZRC 1965.11.11.16); D, *Chlorodiella nigra* (Forskål, 1775) 17.3 × 11.0 mm, Singapore (ZRC 1999-0074). Dactyli for B-D laterally transposed for comparison with left dactylus of A. Scale bars: 1.0

orbital hiatus so that this opening can often be completely closed. Consequently, the antennal flagellum is excluded from the orbital hiatus. The remaining four chlorodiine genera possess an antennal basal segment without a prolonged anterolateral external angle and the orbital hiatus is open, through which the antennal flagellum can be freely directed backwards into the orbit. After examination of specimens of various *Phymodius*, *Tweedia*, *Chlorodiella* and *Liocarpilodes* species, it was this latter description, as given in the key to the genera (Serène 1984: 232-233), which proved to be correct.

Sulcodius miliaris

(A. Milne Edwards, 1873) n. comb.

(Figs 1-5; 6A; 7A; 8A, B)

Chlorodius miliaris A. Milne Edwards, 1873: 216, pl. 8, fig. 3. — Miers 1884: 531. — Guinot 1964: 23, pl. 10, figs 1-2.

Chlorodiella miliaris? — Forest & Guinot 1961: 96.

Chlorodiella miliaris — Serène 1984: 255 (key), 257-258, pl. XLIII D.

Zoozymodes miliaris — Balss 1938, unpaginated cap-

tion for pl. 2, fig. 2 (part).

non *Chlorodius miliaris* — De Man 1887: 280 = *Leptodius effereus* (Rathbun, 1907)?

non *Zoozymodes miliaris* — Balss 1938: pl. 2, fig. 2 = *Leptodius effereus* (Rathbun, 1907)?

MATERIAL EXAMINED. — **Nouvelle-Calédonie**. Coll. M. Balansa, 3 ♀♀ syntypes 10.5-15.0 mm (MNHN-B 20979). — Nouméa, 1.VI.1989, coll. DAWA, 1 ♂ 22.6 mm (MNHN-B 24819). — Secteur de Nouméa, stn 13, 22°20'S, 166°25'E, 20 m, coll. B. Richer de Forges, 2 ♂♂ 7.2-16.5 mm (MNHN-B 24836), 1 ♀ 9.4 mm (MNHN-B 24817). — Stn 15, 22°20'S, 166°31'E, 27 m, 2 ♂♂ 10.0-21.4 mm, 1 ♀ 13.3 mm (MNHN-B 24827). — Stn 251, 22°19'S, 166°25'E, 20 m, 3 ♀♀ 13.0-17.0 mm (MNHN-B 24829). — Stn 279, 20°20'S, 166°27'E, 29 m, 1 ♂ 16.5 mm (MNHN-B 24833). — Baie de Prony, île Ouen, stn 119, 22°28'S, 166°46'E, 20 m, 3 ♂♂ 7.6-14.0 mm, 2 ♀♀ 8.3-10.4 mm (MNHN-B 24820). — Stn 124, 22°31'S, 166°44'E, 18 m, 3 ♂♂ 7.5-18.8 mm, 1 ♀ 15.4 mm (MNHN-B 24822, now ZRC 1998.793). — Stn 155, 22°31'S, 166°38'E, 23 m, 6 ♂♂ 8.0-12.5 mm, 9 ♀♀ 9.0-15.0 mm (MNHN-B 24831). — Stn 232, 22°35'S, 166°43'E, 28 m, 1 ♂ 14.0 mm (MNHN-B 24824). — Baie de St Vincent, stn 178, 22°01'S, 166°04'E, 20 m, 1 ♂ 25.7 mm (MNHN-B 24818). — Stn 211, 21°55'S, 165°52'E, 12 m, 1 ♂ 13.6 mm (MNHN-B 24825). — Atoll de Surprise,

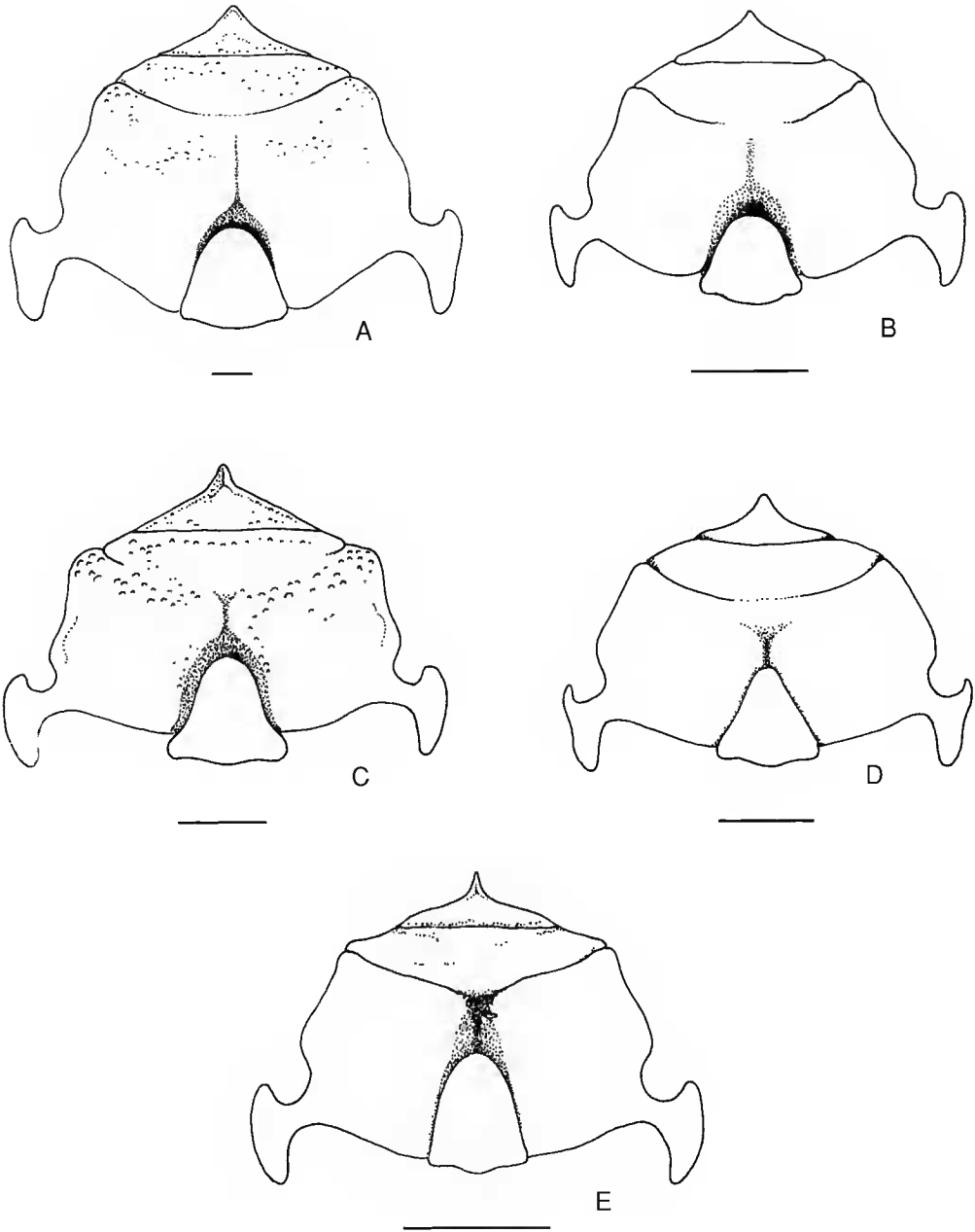


FIG. 8. — ♂ Anterior thoracic sternites; **A, B**, *Sulcodius miliaris* (A. Milne Edwards, 1873) **A**, 21.2 × 13.7 mm, **B**, 16.2 × 9.9 mm; Seychelles (NHM 1882.24); **C**, *Pilodius granulatus* Stimpson, 1859 11.5 × 6.9 mm, Singapore (ZRC 1999-0073); **D**, *Phymodius unguatus* (A. Milne Edwards, 1873) 22.7 × 15.3 mm, Cocos-Keeling Islands (ZRC 1965.11.11.16); **E**, *Chlorodiella nigra* (Forskål, 1775) 17.3 × 11.0 mm, Singapore (ZRC 1999-0074). Scale bars: **A, B**, 2.0 mm; **C, E**, 2.5 mm; **D**, 1.0 mm.

stn 449, 18°22'S, 163°09'E, 21 m, 28.II.1985, 1 ♂ 11.9 mm (MNHN-B 24823). — Grand Récif Sud, stn 550, 22°59'S, 166°58'E, 24 m, 15.VII.1985, 2 ♂♂ 8.0-16.0 mm, 1 ♀ 8.0 mm (MNHN-B 24828). — Lagon Nord-Ouest, Stn 920, 20°52.5'S, 164°28.0'E, 10-11 m, 26.IV.1988, 1 ♀ 13.5 mm (MNHN-B 24834). — Stn DW 921, 20°51.2'S, 164°26.6'E, 12-13 m, 27.IV.1988, 1 ♂ 10.0 mm (MNHN-B 24826). — Stn DW 922, 20°50.9'S, 164°24.4'E, 12-13 m, 27.IV.1988, 1 ♂ 13.0 mm (MNHN-B 24821). — Stn DW 923, 20°48.7'S, 164°24.2'E, 9 m, 27.IV.1988, 1 ♀ 8.5 mm (MNHN-B 24832). — Stn DW 939, 20°36.7'S, 164°15.5'E, 12 m, 27.IV.1988, 1 ♀ 9.7 mm (MNHN-B 24830). — Passée de Boulari, 15 m, 20.III.1988, 1 ♂ 8.5 mm (MNHN-B 24835). **Seychelles.** 11.1882, coll. HMS *Alert*, 2 ♂♂ 16.2-21.2 mm (NHM 1882.24), No. 194, 4-12 fms.

DESCRIPTION OF LARGEST (25.7 MM) MALE SPECIMEN (MNHN-B 24818)

Carapace approximately hexagonal, broader than long, most regions well-defined, grooves demarcating regions deep, not piliferous; 1F deflexed, separated from 2F by strongly granulated transverse row of small rounded granules; long soft setae obscure frontal margin; 2F separated from 1M by transverse granulated ridge, which becomes weak as it reaches orbital region; 2M separated from 1M by strong transverse granulated ridge which joins deep groove separating it from 2L; 3M large, well-defined by distinct grooves all round, separated from narrow 4M by shallow transverse groove; 1P slightly swollen; 2P narrow, entire, but constricted medially to form waist-like structure; 2L region large, surface convex; 1L and 3L regions narrow, not clearly demarcated; 4L large, clearly separated from 2L and 5L by shallow grooves; 5L and 6L well-defined; 1-3R poorly demarcated, surfaces strongly granulated, covered with long soft setae. Subhepatic, suborbital, pterygostomial and sub-branchial regions granulated; pterygostomial, sub-branchial and posterolateral regions densely covered with long soft setae. Frontal margin lamelliform; projecting outwards beyond orbits, margin bilobed, inner lobe subtruncate, outer lobe triangular, tip rounded; internal supraorbital tooth large, level with frontal margin, covered with long soft setae which obscure outline; supraorbital margin with deep median cleft; infraorbital margin with sharp granules,

entire; external orbital tooth acutely triangular, well-developed; subhepatic region with distinct tooth visible dorsally; anterolateral margin gently convex; first anterolateral tooth broadly triangular; second and third anterolateral teeth acutely triangular, tip rounded but turned slightly anteriorly, margins (especially anterior margins) lined with granules; posterolateral margin gently sinuous, strongly converging towards posterior carapace margin; posterior margin of carapace gently convex posteriorly. Antennules folding almost transversely, lower margin of antennular fossa and interantennular septum (proepistome) granulated. Basal antennal segment very large, granulated, external angle strongly produced, filling up entire space of orbital hiatus; second and subsequent segments attached to basal segment medially; peduncle small, subovate; antennal flagellum not entering orbits, but between cleft formed by outer lobe of frontal margin and internal supraorbital tooth. Epistome broad, median part not depressed; posterior margin strongly sinuous, with well-developed median lobe which is separated by a deep median fissure and two lateral lobes with convex margins.

Third maxilliped quadrate, surfaces finely granulose; ischium rectangular, separated from basis by medially interrupted suture, inner margin serrated, median oblique sulcus deep; merus squarish, with slightly produced, subauriculiform anterolateral angle; exopod stout, relatively broad, reaching distal edge of merus, with long flagellum; carpus rounded, dactylus (when opposed against merus) reaching beyond lower edge of merus.

Chelipeds long, surfaces finely granulose; merus very elongate, protruding well beyond edge of carapace; merus unarmed, dorsal surface deeply grooved medially, lined with dense short setae, anterior and posterior margins folding medially; carpus with weak tubercle on inner disal angle; palm slender, elongate, left palm distinctly larger and more swollen than right; fingers long, slender, cutting edges of larger chela with teeth on proximal half and small denticles on distal half; cutting edges of smaller chela lined only with denticles, tip distinctly spoon-shaped; fingers pigmented black, pigmentation on pollex extending some distance into distal part of palm on both inner and outer surfaces.

First ambulatory leg longest, outer surfaces gently granulated, margins of all segments lined with long soft setae which obscure the outline; merus not cristate, dorsal margin gently serrated; dorsal margin of carpus gently serrated; dorsal and ventral margins of propodus serrated; dactylopropodal articulation very well-developed; dactylus distinctly curved, outer margin lined with large, sharp tubercles, inner margin with small sharp granules; subdistal edge of ventral margin with very large sharp recurved spine which is distinctly larger than distal spine.

Anterior thoracic sternum relatively broad, covered with numerous small granules, especially on anterior half; sternites one and two fused, no suture discernible; suture between sternites two and three very deep, lined by rounded granules; sternite three narrow, suture between sternites three and four shallow but discernible, lined with irregularly spaced granules, cleft discernible only laterally; sternite four with distinct but shallow median longitudinal suture; male abdomen reaching to imaginary line joining posterior part of cheliped coxae; posterior part of episternite seven lamelliform, flap-like, forming broad groove between it and rest of sternum into which lateral part of abdominal segment three fits.

Abdomen seven-segmented including telson, but segments three to five fused, immovable, sutures not obvious except laterally (Fig. 3); segment one broader laterally, posterior margin distinctly granulated; segment two broader, lateral margins granulated; segment three trapezoidal, posterior margin with broad depression; segments four and five progressively more rectangular; segment six rectangular, lateral margins distinctly concave; telson semicircular.

Gonopores coxal. Male first pleopod slender (Figs 4; 5), broadly C-shaped, tip directed outwards, dorsal part of subdistal margin with long plumose setae, rest of margin with short, sharp spines, distal part elongated, tip open. Male second pleopod relatively short, basal segment slender, well-developed, distal segment cup-like, very short, not elongated.

REMARKS

The three dried type specimens in the MNHN are all female and dismembered, with only the

carapace and parts of the chelipeds (detached) intact (Forest & Guinot 1961). The chelae and meri of the chelipeds, however, are still intact. These specimens were examined by the present authors and there can be little doubt that the present specimens from New Caledonia and Indian Ocean are probably conspecific with *S. miliaris*. The selection of a lectotype is pointless because all the type material is in such poor condition. The figure presented by A. Milne Edwards (1873) of *S. miliaris* (as a *Chlorodius*) is rather schematic. It does not show the sculpture of the carapace accurately, nor the groove on the merus of the cheliped. The figures provided by Guinot (1964) are only of the carapace and palm of the cheliped. Therefore the species is redescribed and illustrated here in detail on the basis of the new specimens from the type locality.

Several characters vary: the strength of the carapace granules, the degree of spinulation on the infraorbital margin; and the shape of the distal part of the male first pleopod. One of the two largest males (MNHN-B 24818) is rather unusual in having sharp granules lining the infraorbital margin whereas in most specimens, the margin is lined with rounded or blunt granules. This character is, however, not size-related as some smaller specimens also have relatively sharp granules lining the infraorbital margin. The larger chela of the largest male specimen (MNHN-B 24818, Fig. 2A) is also unusual in being distinctly more slender than an equivalent-sized male (MNHN-B 24819, Fig. 2B) and with a slightly different dentition on the cutting edges of the fingers. Its chelipedal meri are also relatively more slender and slightly longer. In almost all other specimens, including females and smaller males, the larger chela is more inflated and rounded, the basal teeth on the cutting edges of the fingers are stronger. There are some specimens, however, which have intermediate chelae (e.g. male 13.0 mm, MNHN-B 24827). The male first pleopod of the largest male (MNHN-B 24818, Fig. 4) also has the distal part slightly more twisted.

The specimens from the Seychelles reported by Miers (1884) (NHM 1882.24) are probably conspecific with *S. miliaris*. The larger male (13.7 mm) differs from all the Pacific specimens

in having a more quadrangular and less transversely ovoid carapace, the protogastric region is more flattened, the anterolateral teeth are more spiniform, and the fingers of the larger left chela are more strongly gaping. The smaller male specimen (9.9 mm), however, agrees well with the Pacific specimens in all major character states. The distal part of the male first pleopod of both Seychelles specimens appears to be relatively more slender and sharply tapering compared to specimens from New Caledonia of comparable sizes, but this is regarded as intraspecific variation.

NOTE ADDED IN PRESS. — Ng & Yang (1998) recently described a new genus, *Vellodius*, for *Pilodius etisoides* Takeda & Miyake, 1968, a species which was regarded as *incerta sedis* by Clark & Galil (1993). *Vellodius* can be separated from *Sulcodius* by the anteroexternal angle of its basal antennal segment not produced and not entering the orbital hiatus, its proportionately more elongate anterior sternal plastron and the absence of a dorsal groove on the chelipedal merus.

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